

UCLA CEE 141: Structural Steel Design

Fall 2018

Class Project Assignment



Westwood Blvd.

Los Angeles, CA 90024

MEMO

Date: October 15, 2018

To: CEE 141 Student Engineering Firms

From: Susie Bruin, AIA, Principal Architect

Re: West Coast Office Headquarters for Yoogole
Project Overview

UCLA Architects has been retained by the major internet search company, Yoogole, to design their West Coast Office Headquarters, which will be located at their state-of-the-art technology complex in Venice, California. Yoogole is moving an entire branch of their company, and need the additional office space to support their operations.

The Office Headquarters is envisioned to be constructed using steel framing in order to expedite the construction schedule and provide for occupancy at the soonest possible date. In order to meet the developer's desired opening date for the facility, construction documents must be developed and submitted for review no later than December 5, 2018.

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The design basis for the new Office Headquarters is as follows:

- Refer to the provided drawings for the building configuration and all dimensional information.
- All interior floors are to be office occupancies.
- All elevated floors are to be framed with steel.
- Floor framing will be composite beams and girders supporting concrete fill on metal deck. 3 ¼" lightweight concrete is recommended for the deck fill.
- Roof framing will be steel beams and girders supporting bare metal roof deck.
- The lateral force resisting system (LFRS) is to be steel moment resisting frames.
- Live loads are to be determined according to code minimum requirements.
- Live load deflection for typical floors may be designed to code maximum deflections, however Level 2 will house computer servers that are deflection sensitive. Live load deflections at Level 2 must be limited to L/480.
- The building will have a single-ply membrane roof, weighing 10 psf (including insulation).
- Mechanical, electrical and plumbing distribution systems are estimated to weigh 6 psf.
- Suspended acoustic ceiling systems above the office occupancies weigh approximately 3 psf.
- The exterior wall system is metal panel on steel studs, estimated to weigh 12 psf (based on projected surface area). There is a 4 ft tall parapet anticipated. Live load deflection at perimeter framing must be limited to 3/8" to accommodate the exterior wall design.
- Your design may neglect the following items:
 - Floor openings for stairs, elevators and shafts
 - Screen walls and penthouses above the roof level
- Wind and seismic designs are not required for this preliminary submittal.

We are requesting your firm to provide a design for the steel framing meeting the criteria listed above. In addition, to facilitate cost estimation, we request a summary "take-off" of

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steel member weights (in Tons) and estimated material costs to be submitted with the final design package. Note that our cost estimator has indicated that structural steel costs for the project should be estimated at \$4,000 per Ton.

Requirements for the design deliverables are indicated below:

- The developer has requested the project to be submitted in several “Increments” to allow them to track progress toward the final design and verify conformance with the required criteria. Specific requirements for the Incremental submittals will be communicated throughout the design schedule.
- You are to retain the original copies of each Incremental deliverable and submit a copy for the developer’s review. The developer will return comments for each Increment that must be addressed in the final design package.
- All submittals must clearly identify your firm name, group number, member names, and student IDs.
- Quality of presentation will be considered in the grading of the submittals—particularly for the final submittal. The submitted packages should appear organized, neat and professional. Handwritten calculations are acceptable, and must be legible. If automated calculations are submitted for this package, they must be presented such that it is easy for the plan reviewer to follow from step to step. MathCad or equivalent is encouraged for automated calculations. Excel spreadsheets are not recommended. Automated calculations submitted for review must also include an example calculation, by hand, to verify results, and must clearly indicate the equations that are being used. If calculations are split up between multiple designers, the sequence and format of the calculations should be coordinated to be the same.

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- The final design package **must** include the following items:
 1. A letter to us (UCLA Architects) that presents your design package and clearly states your estimated total cost for the structural steel scope (furnished and installed).
 2. A structural calculation report, submitted in a bound 8 ½" x 11 format with tabs dividing each section.
 - a. List firm name, member names and student IDs on the report cover
 - b. Divide the report into sections for:
 - i. Loading Criteria
 - ii. Column Load Tabulations
 - iii. Column Design
 - iv. Beam and Girder Design (Floor Framing, Roof Framing)
 - v. Connection Design
 - vi. Steel Member take-off and cost estimate
 3. Structural Drawings,
 - a. Complete the template drawings provided with this letter. **All markups must be done using Bluebeam Revu.**
 - b. Submit drawings plotted at half-size on 11" x 17" sheets.
 - c. List firm name, member names and student IDs in the Title Block on every sheet
 - d. General Notes Sheet
 - i. Loading and design criteria
 - ii. Material properties used in the design (steel members, bolts, weld electrodes, etc.)
 - e. Typical floor and roof framing plans
 - i. Indicate sizes of beams and girders, camber (if any), and number of studs for each beam
 - ii. Callouts for typical detail references
 - f. Column Schedule
 - i. Indicate gravity column sizes
 - ii. Indicate column splice locations

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g. Structural Details

- i. Typical beam-to-girder connection for the Roof Level (heaviest connection)
- ii. Typical beam-to-girder connection for Office Level (heaviest connection)
- iii. Typical girder-to-column connection for Office Level (heaviest connection)
- iv. All details shall be drawn at $1 \frac{1}{2}'' = 1'-0''$ scale or larger.

We are pleased that your firm is available to perform this design and we look forward to the experience of working together on this exciting project. As the design progresses, Incremental submittal guidelines may modify this overview. Incremental instructions will govern over this document.

Remember, final submittals are due at the beginning of class on **December 5, 2018**. As noted in our design services agreement (the class syllabus), no late work will be accepted.